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Working Paper

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Manpower, Personnel, and Training MANPRINT Baseline for the M551 Sheridan

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MANPOWER, PERSONNEL, AND TRAINING MANPRINT BASELINE FOR THE M551 SHERIDAN

Executive Summary

Purpose

One objective of the manpower and personnel integration (MANPRINT) program is to provide historical data on predecessor systems in support of new system acquisition. The purpose of this report, then, is to provide a manpower, personnel, and training (MPT) baseline on the Sheridan and to extrapolate critical lessons learned to apply to the follow-on, the Armored Gun System, currently under development. Data for the report were gathered from historical records, technical reports, Army and Department of Defense data bases, and subject matter experts.

MANPRINT

Manpower. Early manpower shortages were due mainly to training shortfalls, compounded by numerous changes in both the crew and the maintainer Military Occupational Specialties (MOSs). More recently, there have been mismatches between training and duty assignments, an occurrence not restricted to the Sheridan.

Personnel. Because the Sheridan is fielded in only very limited numbers today, Sheridan-trained personnel are drawn from a larger MOS pool. That pool shows the current Army trend toward smarter, older, and more experienced soldiers compared to 10 years ago. Early maintenance personnel inadequacies were addressed through a change in Aptitude Area; however, no information was available to determine the effectiveness of that change.

Training. The most serious of the Sheridan MPT problems were training problems. Despite the early identification of the need for a training device, no comprehensive training plan was implemented once New Equipment Training was completed. Later, Additional Skill Identifiers (ASIs) were developed for Sheridan, attainable either through school training or on-the-job-training. Even after that, however, an intensive review of the Sheridan's operational readiness revealed a critical shortfall of trained Sheridan mechanics, a problem worsened by the difficulty of maintaining the "high tech, high risk" Sheridan under the best of circumstances. It was not until 1978, the year the Sheridan phase-out began, that dedicated MOSs were established along with the associated MOS-producing training. Also in 1978, an improved conduct of fire trainer was fielded.

Conclusions

In the first couple of years following Sheridan's fielding, the combination of MPT problems, particularly those associated with the maintainer, the Sheridan's inherent maintenance problems, and the risk of secondary explosions served to undermine troop confidence in the system and lower the system's operational effectiveness. Then, just when the Sheridan was "fixed," the system was phased out.

Lessons to be learned are (1) identify crew and maintainer target audience early; (2) determine the extent of the disparity between system requirements and the skills and abilities of that target audience; (3) to avoid apparent manpower shortages, train the right numbers of soldiers; (4) maximize the match between training and duty assignments; (5) develop a comprehensive training plan along with the training devices; (6) obtain leadership support of training; (7) and, when problems are found, work toward timely resolution.

Introduction

Purpose

The identification of lessons learned from predecessor or comparable systems is an important step in the application of the manpower and personnel integration (MANPRINT) program to a system under development. The M551 Sheridan, also known as the Armored Reconnaissance Airborne Assault Vehicle (AR/AAV), is the predecessor system for the Armored Gun System (AGS) for which requirements are being developed now. The purpose of this report is to document the history, or baseline, of the Sheridan with respect to the manpower, personnel, and training (MPT) domains of MANPRINT. The baseline can be used to derive Sheridan MPT lessons learned which can then be applied to the AGS as appropriate. This report is also intended to facilitate comparison between potential AGS candidates and the requirements, rather than between candidates and the Sheridan, a system now over 20 years old. This report was written at the request of the Program Manager for AGS.

Scope

The history of the Sheridan, including the Shillelagh missile where applicable, is reviewed briefly. "Snapshots" of the peak Sheridan fielding, critical junctures and events, and the current, limited fielding are provided. In some cases information was not readily available or was incomplete, due in part to the only relatively recent advancement and widespread use of computerized data bases. Finally, lessons learned are presented.

Method and Data Sources

Data were obtained from review of historical records; technical reports on the M551 Sheridan, the Shillelagh missile, and the AGS; technical and field manuals; and various versions of AR 611-201, Enlisted Career Management Fields and Occupational Specialties. Early personnel data were obtained from the Defense Manpower Data Center and current FOOTPRINT data were obtained from the U.S. Army Personnel Integration Command. Crosswalk data from the End Item-MOS Interface and the Manpower Authorizations Requirements Criteria (MARC) data bases and the Work Order Logistics File (WOLF) data were obtained from the Materiel Readiness Support Activity. Interpretation of this information was aided by telephone interviews with Sheridan subject matter experts. Individuals at the Army Materiel Command (AMC) Historical Office, the Tank Command Historical Office, the Armor School, the ARI Fort Knox Field Unit, and the ARI Manned Systems Group were helpful in supplying information.

General System History

Concept development and technical feasibility studies for the Sheridan began in 1959, including identification of a training device requirement. Engineering design of present system began in 1961 and type classification was assigned in 1966. Production continued until 1970 when 1700 had been built, 1570 of which were still in service in 1978. The Sheridan was built to fire the Shillelagh guided missile as well as a conventional, 152mm round with a combustible cartridge. In 1971, the Sheridan was retrofitted with a laser rangefinder and designated the M551A1. Beginning in 1978, the Sheridan was phased out and replaced by the M60A1 main battle tank. Fifty-seven Sheridans were assigned to the 82nd Airborne Division and 330 to the National Training Center at Fort Irwin to be used as opposing forces vehicles.

The role of the lightly armored Sheridan was to function as the main reconnaissance weapon for armor, infantry, and airborne operations and arms teams not employing the main battle tank. Between 1968 and 1970, the Sheridan was deployed world-wide, to the continental United States, Hawaii, Germany, Korea, and Vietnam, replacing tanks in many units. Including the initial deployment of 64, 240 Sheridans, used almost exclusively as gun systems, saw service in Vietnam as "jungle-busters," "boring" through the foliage. In 1989 the Sheridan saw action with the 82nd Airborne in Panama during Operation Just Cause, again as a gun system, providing direct fire support, blowing entry holes for infantry assault, and also as a "show of force." Most recently the Sheridan was deployed to Operation Desert Storm and training was revived at the Armor School in support of that effort.

The history of the Sheridan has been characterized as programmatically turbulent, and beset with logistical, technical, and operational problems. The program management changed hands from the Ordnance Tank Automotive Command to the Weapons Command to the Tank-Automotive Command. The Shillelagh missile was originally managed with the Sheridan as a unified system, but was transferred to the Missile Command mid-program. Other components were managed separately also: A 1975 Sheridan assessment required input from five different commodity commands.

The logistical problems were aggravated by the rapid, wide-spread deployment and the resulting low equipment density. The technical problems were various and were accentuated by the fact that many of the components were current state-of-the-art and, therefore, high risk. Two components are of particular interest: the combustible-case ammunition round and the electronics and electronics self-tests.

The combustible-case ammunition round tended to leave burning debris in the turret, representing a safety hazard itself and an increased risk for secondary explosions. A closed breech scavenger system was designed to eliminate this problem; however, testing and installation were not completed until 1972, three years after initial deployment to Vietnam.

The electronics were viewed as not standing up well to the system vibration and recoil. This view was due, in part, to the self tests. In one case, if the missile self-test was performed without first performing the alignment test, then the missile would show a "no-go." In another case, running the boresighting self test would burn out other components of the electronics system leading to a negative cycle of maintenance problems. Such self-test unreliability led to field work-arounds outside the normal preventative maintenance checks and services.

The roots of the operational problems were insufficient numbers of trained crews and maintainers and a lack of troop confidence in the system. The lack of troop confidence is repeatedly documented as stemming from the frequent breakdown of the fragile electronics and the consequent maintenance problems. It also certainly resulted from persistent, but factual anecdotes early on about the susceptibility of the system to turret penetrations and internal explosions: The first action the Sheridan saw in Vietnam involved the secondary, deadly explosion of its own combustible-case ammunition rounds after running over a mine.

MANPRINT

System Performance

Throughout the documentation reviewed, references were made to poor Sheridan performance as it relates to manpower, personnel, and training problems; however, only two reports of actual performance data were located. Both are of gunner performance with the Shillelagh missile.

The first is from a 1968 report of a training exercise: Of 112 missiles fired, 88 were hits, a 76% hit-rate. For stationary targets, 50 out of 59 were hits. The 9 misses were categorized as due to erratic missiles. For moving targets, 34 out of 53 were hits. The misses were categorized as one erratic missile, four system errors, and the remaining 14 as gunner errors (26% of the total launches).

The second report is from a 1977 baseline used to validate the upgraded trainer. Overall only 54.5% hits were reported, with no attribution of error. The breakdown by condition is shown in Table 1.

Table 1. Sheridan Live-Missile Baseline for 1977 Improved Conduct of Fire Evaluation.

Target Condition	Hit	Miss	Total
Day-Stationary	3	1	4
Day-Moving	2	2	4
Night-Stationary	1	2	3
	6	5	11

An understanding of the gunner's task helps to explain the relatively poorer performance with moving targets: The gunner was required to track the target throughout missile flight to enable missile guidance. If the gunner tracked too low, the missile would be grounded, too fast or off the target for some percentage of time and the missile would miss. These data give an incomplete, and perhaps inconsequential picture of Sheridan effectiveness, however, because the Sheridan's primary use both in Vietnam and Panama was as a gun system, not a missile system.

Manpower

Crew and Maintainer Military Occupational Specialties (MOSs). An early account of the Sheridan history states that a final decision on the MOSs for Sheridan was made in 1966. This was not the case. A trail of MOSs are associated with Sheridan operation and support.

The M551 Sheridan operates with a 4 man crew--commander, gunner, loader, and driver. Dedicated MOSs were not established until 1978, ironically, the same year phase-out of the Sheridan began. Table 2 shows the MOS transitions. The earliest available documentation shows the 11E, Armor Crewman, with an Additional Skill Identifier (ASI) of R8 (Sheridan Crewman) as the commander, gunner, and loader. The 11D, Armor Reconnaissance Specialist, with the R8 ASI, was the driver. In 1978, a dedicated commander, loader, gunner MOS, 19G, Armor Reconnaissance Vehicle Crewman, and a dedicated driver MOS, 19H, Armor Reconnaissance Driver, were established. Sometime after the phase-out of the Sheridan, the 19D, Cavalry Scout, with the R8 ASI, became the Sheridan crew MOS.

The available records show the turret mechanic MOS changing at least as frequently as the crew MOSs (see also Table 2). The first was the 45G, Turret Artillery Repairman. Next came the 45K, Tank Turret Repairman, with the M9 ASI. Then, in the mid-1970s, a dedicated MOS, the 45P Sheridan Turret Mechanic, was established, but that MOS was phased out in 1980. Today, the 45N, M60A1/A3 Turret Mechanic, with an R8 ASI, is the Sheridan mechanic.

Table 2. Sheridan MOSs: Sample Years from 1968 to 1989.

		1968	1971	1978	1980	1989
Crew Members	MOS ASI	?	11E R8	19G----->19G		19D R8
Primary Driver	MOS ASI	?	11D R8	19H----->19H		-
Turret Mechanic	MOS ASI	45G	45K M9	45P	?	45N R8
Tank Mechanic	MOS ASI	?	?	63C	?	63N R8

Both the R8 and the M9 ASIs designate Sheridan-specific training.

The audit trail for the tank system mechanic MOS is incomplete and the identification of the 63C, Track Vehicle Mechanic, in the 1970s is based on subject matter expert recollection. The 63C, like the 45P, was phased out in 1980. Today, the 63N, M60A1/A3 Tank System Mechanic, with R8 ASI, performs system maintenance for the Sheridan.

It should be noted that a separate MOS, the 27H, the Shillelagh Missile System Repairman, was responsible for missile inspection and maintenance. On-site, however, the crew used on-board self-test equipment to determine if the missile system was ready. If a no-go was obtained, the organizational turret mechanic attempted to isolate the fault.

Manpower Shortages. A series of letters to and from the Project Management (PM) Office in the early 1970s documented Sheridan manpower shortages, most critically, shortages of trained turret mechanics. "Last fall (1970) hardly a trained Sheridan turret mechanic was in USAREUR (U.S. Army Europe), none in USARV (U.S. Army Vietnam)" (from a letter dated 4 Aug 71 from the Sheridan PM to CG, U.S. AMC, and to the Assistant Chief of Staff for Force Development). The letters cite an improving but still bleak trend: In May 71, USARV had ten 45K with M9 ASI versus 53 authorized, 18 in June, 37 in September. For crewman in that same time frame, USARV theater records showed that only 118 were school-trained 11Es with R8 ASI out of 618 authorized.

The manpower problems can largely be construed as training shortfalls (which will be discussed later), but not entirely. The seriousness of the problems was compounded by the Sheridan's low equipment density. Only one or two turret mechanics were

authorized per unit, so that if one or two were missing, maintenance capabilities were severely hampered.

As shown in Table 3, the shortage of trained personnel seems to have been overcome by 1979-1980, but assignment problems persisted. In fact, the records show more 19Gs, 19Hs, and 45Ps were trained (Primary MOS) than were performing in those MOSs (Duty MOS). Unfortunately, there is an assignment mismatch for those three MOSs that goes both ways: Only about half (46.1% to 54.0%) of the Sheridan-trained personnel were assigned Sheridan jobs, and between 26.1% and 46.3% of those performing in Sheridan jobs were doing so without school training. The data for the 63C show about the same percentage of matched placements, 59.3%, but a staggering percentage of mismatched placements--75%. Unfortunately, no information was available to help explain this figure.

Table 3. The Numbers Reporting Sheridan-Related MOSs in 1979-1980 and in 1988-1989 and the Percent Matched and Mismatched Placements.

Years	MOS	Number with: Primary MOS	Number with: Primary & Duty MOS	% Matched Placements	Number with Duty MOS Only	% Mismatched Placements
1979-1980	19G	817	400	49.0	613	34.7
	19H	282	130	46.1	242	46.3
	45P	126	68	54.0	92	26.1
	63C	4482	2659	59.3	10,646	75.0
1988-1989	19D	9551 (237)**	7903	82.7	*	-
	45N	267 (22)	213	79.8	*	-
	63N	1201 (58)	981	81.7	*	-

% Mismatched Placements =
((Duty MOS - Primary and Duty MOS) / Duty MOS) X 100.
* Data not readily accessible for 1988-1989.
** Parentheses show number of R8 ASIs authorized for the MOS.

The figures for 1988-1989 show a higher percentage of matched placements: 79.8% to 82.7%. The figures on Duty MOS were not readily available, precluding a complete comparison with the 1979-1980 figures. Further, the 1988-1989 figures represent the entire MOS and those with Sheridan ASIs make up only a small fraction; therefore, they show a general, peace-time Army trend toward a higher percentage of matched placements, not a Sheridan-specific trend.

Maintenance Manhours. Although references to Sheridan's poor maintenance record are abundant, data are not. A sample data collection on Sheridan maintenance was referenced in a letter from the PM in 1975 but no substantive records could be located for inclusion in this report. Some recent statistics are available and are shown in Table 4.

Table 4. Statistics on Work Orders (WOs) on File against the Sheridan from 1986-1990.

Total Number of WOs	Average WOs per Year	Total Manhours	Average Manhours per WO	Total Days Down	Average Days Down per WO
2184	436.8	8903.8	4.1	16,289	7.5

Current Table of Organization and Equipment (TOE). An extract of the current TOE for a Light Armored Battalion is shown in Table 5. The numbers in parentheses are the numbers of personnel with Sheridan-specific training authorized out of that MOS. For example, the Headquarters and Headquarters Company is authorized eight 19D with R8 ASI out 68 19Ds total.

Table 5. Extract from the TOE for a Light Armored Battalion.

	Headquarters & Headquarters Co	Light Armor Co (x4)	Battalion Total
Officers	25	5	45
Warrant Officers	2	0	2
Enlisted	283	58	562
(19D R8)	(8/68)	(41/54)	(172/284)
(45N R8)	(14/14)		(14/14)
(63N R8)	(21/25)		(21/25)
Total Personnel	310	63	609
Sheridans	2	14	58

Numbers in parentheses are the numbers of personnel authorized for Sheridan ASIs out of the total authorizations for that MOS.

MOS-End Item Crosswalk. A listing of MOSs that provide maintenance support for the Sheridan is shown in Table 6. The list includes MOSs that provide Direct Support (DS), General Support (GS), and unit level support whereas the TOE shows only unit authorizations.

Table 6. MOS-End Item Cross-Walk out of the MARC Data Base.

MOS	Title	Location
27E	TOW/Dragon Repairer	DS, GS
29E	Radio Repairer	DS
31V	Unit Level Communications Maintainer	Unit
41C	Fire Control Instrument Repairer	DS, GS
44B	Metal Worker	DS, GS
44E	Machinist	DS, GS
45B	Small Arms Repairer	DS, GS
45G	Fire Control System Repairer	DS
45K	Tank Turret Repairer	Unit, DS, GS
45N	M60A1/A3 Tank Turret Mechanic	Unit
63G	Fuel & Electrical System Repairer	DS, GS
63H	Track Vehicle Repairer	DS
63J	QM & Chemical Equipment Repairer	Unit
63N	M60A1/A3 Tank System Mechanic	Unit
63W	Wheel Vehicle Repairer	DS, GS
76Y	Unit Supply Specialist	Unit

Personnel

The early changes in MOSs were largely to drive training changes, but, at least for the turret mechanic, also to achieve a change in personnel selection. The 45G was deemed inappropriate as the Sheridan turret mechanic due to a mismatch with Sheridan requirements of both existing training and personnel skills. The M9 ASI was developed for the 45K to attempt a training fix for the problem. Later, with the change to the 45P, a personnel fix was made.

The Aptitude Area (AA) for the turret mechanic was changed from Mechanical Maintenance (MM), the AA for both 45G and 45K, to General Maintenance (GM), the AA for 45P. The biggest difference between the derivation of the MM and GM scores is that MM includes the Numerical Operations test (a speeded, basic arithmetic test) whereas GM includes the Mathematical Knowledge test (geometry and algebra problems). Therefore, the GM score can be assumed to tap into higher reasoning abilities than the MM score. The only evidence as to the effectiveness of this fix is the lack of evidence to the contrary, the lack coinciding unfortunately with the beginning of the Sheridan phase-out, 1978. Today the AA is again MM, the AA for 45N. No information was

available about the early cutoff scores. As of 1987, the cutoff score for entry into both the 45N and the 63N was an MM of 100.

The AA for the crew MOSs was originally Combat Operations (CO) and remained so through the current MOS 19D. No information was available about the original cutoff scores for entry into the MOS. As of 1987, the cutoff score for the 19D was a CO score of 90.

A snapshot of personnel characteristics for Sheridan-related MOSs for 1979-1980 and for 1988-1989 are shown in Table 7. Note that the 1988-1989 figures represent all individuals reporting those Primary MOSs, not just those with the R8 ASI. Consistent with the overall Army, the pool from which today's Sheridan soldier is drawn tends to have a higher mental category, and be more highly educated, older, and more experienced.

Training

Training Devices. The requirement for Sheridan training devices was established in 1959 with the establishment of the requirement for a Shillelagh conduct of fire trainer (COFT). Eventually, two trainers were developed, the COFT and the Sheridan Weapon System (SWS) Trainer. Later, an improved COFT was developed, the I-COFT.

The COFT (formally the XM35 COFT) includes both a turret-mounted visual effects simulator and instructor console (the XM41 Trainer, Launcher) and an infrared transmitter mounted on some suitable vehicle (originally the XM42 Target, now the M63). The visual effects simulator presents a missile firing image through the "real-world" view of the gunner's telescope. Gunner tracking proficiency and target hits are recorded for later review.

The SWS Trainer (the XM40) is a simulator designed to train crews in all aspects of turret operation, maintenance, and firing, including the sequence of operations, firing, tests, adjustments, maintenance, and the replacement of parts. The trainer includes a simulated 152mm gun/launcher with an operational breech and realistic recoil. For target acquisition and tracking the gunner views 35mm film through the operational telescope. The missile image, with associated smoke, flash, and impact, are presented.

The documentation is confusing, not always making the distinction between the COFT and the SWS Trainer; however, it appears that a total of 194 COFTs were procured and fielded CONUS and overseas and a total of 29 SWS trainers were delivered to the Armor School. The I-COFT was initiated in 1975. In 1978, 103 launchers and 60 targets were fielded, again, ironically, the year the Sheridan phase-out began.

Table 7. Mental Category, Education, and Years of Service Statistics for Sheridan-related MOSs for 1979-1980 and for 1988-1989.

Mental Category

Years	MOS	I	II	IIIA	IIIB	IV	V	UNK
1979-1980	19G	1.7	22.3	22.6	28.0	22.4	0.0	2.9
	19H	3.9	24.5	19.5	25.9	25.1	0.4	0.7
	45P	1.6	14.3	18.3	27.0	34.1	0.8	4.0
	63C	1.1	15.8	17.3	27.7	33.1	0.1	5.0
1988-1989	19D	3.8	27.6	19.0	26.3	14.0	9.4	-
	45N	0.7	19.1	20.6	39.0	19.1	1.5	-
	63N	1.3	25.6	22.5	31.8	17.8	-	1.5

Education

Years	MOS	No HS	GED	HS + or HS	UNK
1979-1980	19G	11.0	82.9	6.0	-
	19H	16.3	81.2	2.6	-
	45P	25.3	68.3	6.4	-
	63C	31.0	66.1	2.8	0.1
		No HS	GED	HS and above	UNK
1988-1989	19D	1.4	10.7	87.8	0.1
	45N	3.7	14.6	81.3	-
	63N	2.1	16.4	81.4	-

Years of Service

Years	MOS	0-4 First Termers	5-10 Mid-Careerists	11-20 Careerists	20+
1979-1980	19G	52.3	40.8	6.9	-
	19H	85.8	13.8	0.4	-
	45P	67.5	29.3	3.2	-
	63C	70.1	12.0	15.7	2.3
1988-1989	19D	55.7	26.0	18.0	0.4
	45N	42.7	52.4	4.9	-
	63N	37.3	29.0	30.0	4.2

Training Problems: Fixes. After being given a demonstration of the Sheridan trainers, the Commanding General of the Armor Center stated that "the training in all respects is adequate for this weapon system" (7 October 1969 letter from Deputy CG, U.S. Army WECOM to Deputy CG U.S. AMC). Despite this pronouncement, the Sheridan had serious training problems.

The first Sheridan training delivered was the New Equipment Training (NET). From January 1969 to March 1970, Sheridan NET was conducted in the Vietnam combat zone. Despite initial logistical support problems due to competing priorities and the lack of training facilities at some locations, training was generally well-received. There were, however, some marked differences between units. One case study report provides a contrast of two units receiving NET, one where the Sheridan was ultimately effectively employed, and the other where it was not. For one unit, the leaders received training along with troops and the training was given in an uninterrupted block. For the other unit, leaders attended NET only intermittently and the training was broken into fragmented sessions. The case study concludes that, for the first unit described, the leadership support for initial Sheridan training was instrumental in overall system effectiveness by fostering an attitude of system acceptance.

Some of the blame for the inadequate training provided for the Sheridan can probably be placed on the number of training devices available: The original basis of issue for the COFT was reduced to two launchers and one target per 27 Sheridans, down from nine and three, so that the total requirement was reduced from 656 to 194.

Further, although Sheridan training devices existed, it was not clear how or when they were used initially. There were no dedicated MOSs and no Sheridan ASIs. School training was for the M60 and M48 series tanks and those school-taught skills, in particular, maintenance skills, did not transfer readily to the Sheridan. The Sheridan turret was a "high-tech" electronics system, having few components in common with the M60 and the M48.

Then in 1971, in order to produce more and better-trained Sheridan personnel, the R8 Sheridan Crew ASI and the M9 Sheridan Mechanic ASI were implemented. The ASIs were earned through either an additional four weeks of Sheridan-specific and electronics training or on-the-job training (OJT). Unfortunately, the OJT route to an M9 ASI was not satisfactory. Only the school training was judged as turning out capable mechanics.

During extensive field visits to ascertain Sheridan's operational status, observers noted:

> "a clear and decided correlation between school training vs. vehicle performance and maintenance. It is noticeably greater than for other armor equipment. The experienced, trained unit maximizes its Sheridans, and their problems are minimal. Where trained crewmen and mechanics are not present, problems multiply and the vehicle is less effective. In some units one end result is that the men's faith in their equipment is shaken." - Letter dated 4 Aug 71 from the Sheridan PM to CG, U.S. AMC, and to the Assistant Chief of Staff for Force Development

Thus, the gamut of Sheridan training problems ranged from NET in a combat zone with variable leadership support, to a cut in the number of training devices, school training on unrelated systems, and adequate school-based ASI training but poor OJT. Finally, in 1978, the dedicated MOSs, and, therefore, the accompanying MOS-producing training were initiated. The timing of Sheridan's phase-out, of course, does not permit an evaluation of the effectiveness of this training.

The only materiel change introduced to address training problems was the I-COFT. It was designed to address identified COFT deficiencies: (1) lack of realism, specifically, no time delay between pressing the fire switch and missile launch, no recoil to provide 'a mild shock impact to the gunner's head' (as contrasted with the SWS trainer which did provide recoil), and no noise; (2) inadequate feedback to either the instructor or the gunner on misses and causes for errors; (3) poor reliability and maintainability; and (4) equipment that was too heavy and time-consuming to install. The operational test report for the I-COFT showed that all noted deficiencies had been met with only a few exceptions. Initial user reaction to the I-COFT was positive.

Prior to gearing up for Operation Desert Storm, Sheridan training was again conducted as OJT. A 53-hour Program of Instruction for Sheridan crews was developed for Operation Desert Storm. Although the training devices still exist, they are not listed as being used for this training course.

Summary and Conclusions

Although from 20 years ago, the following view of the Sheridan could easily be applied to systems under development today.

> "Overly sophisticated equipment is a continuing area of analysis and, hopefully, improvement. The fundamental problem, obvious to everyone, is that the user (combat commander) wants equipment with very sophisticated performance (greater lethality, faster, smoother ride cross-country, counter-measure proof, lightweight, 100% reliable, etc., etc.) but susceptible of being operated and repaired by a twelve-year old boy with a screw-driver. We shall persevere." - from a letter re: the Sheridan, dated November 1970 to the Assistant Secretary of the Army for Installations & Logistics from the Commanding General, U.S. AMC

The Sheridan was a "cutting-edge" system of its time, and so the lessons learned still apply. Despite the long-lead developmental time, it was fielded without the necessary support, particularly training support. Although training devices had been developed, there were no plans for whom to train, where, or when. Training shortfalls had the effect of creating manpower shortages. Inadequate training interacted with inadequate personnel selection. Manpower, personnel, and training fixes were slow in coming. Adding those problems to the Sheridan's initial weaknesses (e.g., component breakdowns, risk of secondary explosions related to the combustible case cartridge ammunition), gave the system a bad reputation.

While most of the high risk technical problems eventually came to be solved, for the MPT problems, the "fixes" came too late. The dedicated MOSs, the associated school training, the improved training device, and the system phase-out all came in the same year--1978. At some point, too, the Sheridan mission was reduced and the soldier "caught up" with the system--became electronically smart so that they were as sophisticated as the system. For the critical years, 1969-1978, however, the Sheridan was a classic example of the need for MANPRINT.

The principle lessons learned to be derived from this report of Sheridan MPT are:

(1) Identify crew and maintainer MOSs early.

(2) Determine the target audience description, including an assessment of the match between the personnel

characteristics and system requirements. A disparity will undermine system effectiveness.

(3) Although Sheridan had manpower shortages, they were primarily shortages of trained personnel. The training plan--from NET to school training to sustainment training--must be geared towards not only effective training, but training the right numbers of soldiers, supported by the right amount of training equipment.

(4) The match of trained soldiers to duty assignments should be maximized.

(5) Development of a training device(s) can not be done independently of a training plan.

(6) Leadership support of training can be critical, as the Vietnam case study concluded.

(7) When problems are found, the Army system should work toward early and timely resolution. The MANPRINT program can help to accomplish this.

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